INTERNATIONAL JOURNAL OF RESEARCH IN PHARMACEUTICAL SCIENCES

A Study of Lipid Profile in Adults in Clinical Correlation with Anthropometric Indices

Vasant Deokar[*], Aditya C Aundhakar

Department of Medicine, Krishna Institute of Medical Sciences Deemed To Be University, Karad, Maharashtra, India

ABSTRACT

Fast industrialisation and Globalisation, with rapid progress on all fronts, has lead to the economic prosperity and modern lifestyle in India. It, in turn, is reflected as an increased prevalence of lifestyle-related diseases in the country. A cross-sectional study was done with 285 subjects. Majority of the subjects (61.1%) were in between 21-25 years. There was a female preponderance (68.4%). 145 (50.9%) and 61 (21.4%) were in the normal range and overweight respectively. It was observed that there were 95 (33.3%) cases of dyslipidemia. Significant association with dyslipidemia. The incidence of dyslipidemia altogether expanded with expanding BMI. There was a significant association of BMI with Dyslipidemia. Waist Circumference (WC), Hip Circumference (HC) and Waist Hip (WH) Ratio increased significantly with increasing BMI. There was a significant association of Anthropometric measurements with Underweight, Normal, Overweight and Obese BMI. There was a significant positive correlation between BMI and TG, while substantial negative relationship existed between BMI and TC and HDL. Dyslipidemia is very common in youthful grown-ups than anticipated. Blend of the way of life treatments, i.e., upgraded physical movement, dietary change, and remedial mediation would help us in treatment and the executives of dyslipidemia. Henceforth, mindfulness programs on attractive eating routine and regular screening of populace on occasional premise ought to be fused at the essential human services level.

[*]Corresponding Author

Name: Vasant Deokar
Phone: 9890447527
Email: vasantvd967@gmail.com

INTRODUCTION

Fast industrialisation and Globalisation, with rapid progress on all fronts, has lead to the economic prosperity and modern way of life in India. It is reflected as an expanded predominance of a method of life-related ailments in the nation (Patel, 2011). Coronary course affliction (CAD) is a noteworthy explanation behind horridness and mortality in industrialised countries and is one of the critical general clinical issues completely. There is a rising verification of unfavourable CAD occurring in Asian Indians, at any rate, ten years sooner when it stood out from other ethnic, social events (Gupta *et al.*, 2009). As indicated by the national commission on macroeconomics and prosperity, there would be around 62 million patients with by 2015 in India and of these 23 million would be patients more youthful than 40 years old. This, at present causes 4.3 million passings for consistently worldwide and 39 million debilitation healthy lifestyle years lost (Ezzati *et al.*, 2002). The national cholesterol preparing program

ncep in like manner made gauges for the unmistakable confirmation evaluation and treatment of high blood cholesterol in adults (Chatlert, 2006). Suitable control of the blood lipid levels reduced cardiovascular terribleness and mortality both in patients with setting up CHD and in those at risk for making CHD. Subsequently, data on the various pieces of the lipid profile and the centrality of all of the parameters is vital and is an essential bit of the leading body of CHD and people at risk for CHD.

Dyslipidemia is in some cases considered as a result of modernisation because the predominance of dyslipidemia in created nations is frequently higher than in creating nations. Moreover, inside both the created and creating nations, the pervasiveness of dyslipidemia is higher in urban regions. While patterns demonstrate that improvement in the paces of CAD in many industrialised countries, the weight is anticipated to rise extensively in creating nations throughout the following decade (Yamwong, 2000).

A few epidemiological examinations right now that serum lipid fixation was higher in a critical piece of the populace and that an expanding extent of the people had dyslipidemia. In creating nations, as the pace of urbanisation expands, the people are progressively reliant on consumes fewer calories considered undesirable exacerbated by low physical action.

The human body can store vitality in an abundance of the sum required for sometime later. Fat cells in fat tissue stops fill this need as well as help to defeat the issue of discontinuous nourishment supplies. They store vitality as triglycerides and when required discharge, it is a type of free unsaturated fats to provide food vitality requests. Today, with constrained physical effort, wrong dietary ways of life, fat vitality stores have expanded bringing about powerlessness to non-transferable ailments (NCD, for example, cardiovascular diseases (CVD), malignancies, diabetes mellitus (DM) hypertension (HTN) because of adjusted body composition (Shah et al., 2010; Maffeis et al., 2001; Wells and Fewtrell, 2006).

The significant hazard factor for NCDs has modified lipid levels (Parinita et al., 2012; Robert, 1998). The body piece is thus a substantial determinant of malady course and results being possibly manageable to adjustment, for sickness anticipation and wellbeing maintenance (Wells and Fewtrell, 2006). Body piece estimated by straightforward anthropometric systems, (weight, abdomen periphery (WC), midsection to the hip proportion (WHR), midriff to tallness proportion (WHtR), and weight list (BMI), are satisfactory for some, reasons, ending up being of a more noteworthy incentive than "entire body"

values acquired by increasingly modern methodologies.

In 2000, 9.2 million years of productive life lost in India was credited to NCD including CVD, DM; which is relied upon to ascend to 17.9 million years by 2030 just about multiple times that of United States (US) (Vita-Finzi, 2005; Government of India Planning Commission, 2011).

The hazard factors for the improvement of CVD, age, sex, family ancestry and hereditary legacy are unmodifiable (Yusuf et al., 2001), while smoking, physical dormancy, terrible eating routine, heftiness, and dyslipidemia are modifiable (Sposito et al., 2007). The commonness of overweight and weight has significantly expanded in creating nations and is identified with cardiovascular hazard factors (Mokdad, 2000).

As per the World Health Organization, in 2008, more than 1.4 billion grown-ups were overweight. Of these more than 200 million men and around 300 million women were corpulent (World Health Organization, 2020) examinations show fat tissue commonly central is connected with high cardiovascular bleakness and mortality (Santos et al., 2013)

Differing techniques have been utilised to evaluate the sum and the conveyance of muscle versus fat and its relationship to CVD. Anthropometric parameters, for example, weight file (BMI), abdomen boundary (WC) and midsection to-hip proportion (WHR) have the focal points in day by day clinical act of being easy to gauge with great reproducibility (Cercato et al., 2004) creating nation like India.

Although BMI reflects lean mass and fat, it barely recognises the conveyance of the latter (Mason et al., 2008). Or maybe, other anthropometric records, for example, WC, midsection to-tallness proportion, and WHR have been utilised as options in contrast to BMI. WC is in effect progressively acknowledged as the best anthropometric pointer of stomach adiposity, and metabolic risk (Thomas et al., 2015).

It is less known, be that as it may, which one of these anthropometric factors (BMI or WHR or WC) is a superior connect to lipid profile. Subsequently, the current investigation was done at our tertiary consideration place to survey the commonness of dyslipidemia in the age gathering of 18-30 years and to relate dyslipidemia with expanded midsection hip proportion and BMI in stable asymptomatic individuals.

Aim

To study the lipid profile, in clinical correlation with anthropometric indices such as BMI and the waist-hip ratio of healthy, people.

Objectives

1. To study the prevalence of dyslipidemia in the age group of 18-30 years.

2. The correlation of dyslipidemia with increased waist-hip ratio and BMI

MATERIAL AND METHODS

A cross-sectional study was done with 285 subjects

Source of data: The sample collection, analysis and verification was conducted in regular healthy volunteers coming to KIMS, Karad. Study design: An observational cross-sectional study.

Sample size: 285 Subjects. Statistical analysis: Quantitative, Qualitative and association with software.

OBSERVATIONS AND RESULTS

Distribution of subjects according to age

Majority of the subjects (61.1%) were 21-25 years age followed by 36.8% 26-30 years and 2.1% were 18-20 years.

Distribution of subjects according to gender

There was female preponderance (68.4%) while male subjects constituted 31.6% of the study group.

Distribution of subjects according to BMI

Majority of 66 (23.2%) subjects were underweight while 145 (50.9%) and 61 (21.4%) subjects were in the normal range and overweight respectively. 13 (4.5%) subjects were overweight.

Incidence of Dyslipidemia

It was observed that there were 95 (33.3%) cases of dyslipidemia in our study

Association of Gender with Dyslipidemia

A total of 44 (48.9%) male patients and 51 (26.2%) of female patients had dyslipidemia. There was no significant association of gender with dyslipidemia

Association of WHR with Dyslipidemia in Males

It was observed that the incidence of dyslipidemia increased with increasing WHR >0.9 in males. There was no significant association of WHR >0.9 in males with dyslipidemia.

Association of WHR with Dyslipidemia in Females

It was observed that the incidence of dyslipidemia significantly increased with increasing WHR >0.85 in females.

There was a significant association of WHR >0.85 in females with dyslipidemia.

Anthropometric measurements of Male and Female Subjects

It was observed that the Waist Circumference (WC) and Hip Circumference (HC) were significantly higher in male as compared to female subjects (p<0.05). In contrast, the Waist Hip (WH) Ratio of male and female subjects was comparable.

Lipid Profile findings of Male and Female

The lipid profile parameters (TC, LDL, VLDL, HDL, LDL/HDL and TG) of male and female subjects in our study were comparable and statistically not significant (p>0.05).

Association with BMI and Dyslipidemia

It was observed that the incidence of dyslipidemia significantly increased with increasing BMI. There was a significant association of BMI with Dyslipidemia.

Association of Anthropometric measurements with Underweight, Normal, Overweight and Obese BMI

It was observed that Waist Circumference (WC), Hip Circumference (HC) and Waist Hip (WH) Ratio increased significantly with increasing BMI. There was a significant association of Anthropometric measurements with Underweight, Normal, Overweight and Obese BMI.

Correlation of Waist-Hip Ratio and BMI with Dyslipidemia

There was a significant positive correlation between BMI and TG, while significant negative correlation existed between BMI and TC and HDL. It was observed that WH Ratio was significantly and negatively correlated with TG, TC and HDL.

DISCUSSION

In the present study, majority of the subjects (61.1%) were from the age group of 21-25 years followed by 36.8% from the age group of 26-30 years and 2.1% from the age group of 18-20 years. There was female preponderance (68.4%) while male subjects constituted 31.6% of the study group. Raj *et al.* (2016) in a descriptive cross-sectional study determining lipid levels and comparing the lipid levels and prevalence of dyslipidemia reported all study subjects were aged more than 30 years, with 190 (58.5%) males and 135 (41.5%) females. A majority of 45.3% males and 45.9% females were in the age group of 45-59 and 30-44 years respectively. Thomas *et al.* (2015) in a cross-sectional study on the prevalence of dyslipidemia in young asymptomatic non- diabetic adults to determine and

correlate the significance of associated risk factors found out of the 500 participants, Out of which adults, 315 (63%) were males, and 185 (37%) were females. The mean age was 31.12 years.

In our study, 66 (23.2%) subjects were underweight while 145 (50.9%) and 61 (21.4%) subjects were in the normal range and overweight respectively. 13 (4.5%) subjects were overweight. Chehrei *et al.* (2007) 44 cross-sectional population-based study compared some anthropometric indices (BMI, WC, and W/Ht) to determine their relationship to dyslipidemia as an important cardiovascular risk factor reported among the 750 subjects,388(51.7%) Raj *et al.* (2016) in a descriptive cross-sectional study determining lipid levels and comparing the lipid levels and prevalence of dyslipidemia found Overweight. Obesity constituted 58.8 % and 63.1% of urban and rural subjects respectively. There was no critical affiliation between the study setting and the presence of co-morbid illness. Thomas *et al.* (2015) in a cross-sectional study on the prevalence of dyslipidemia in young asymptomatic non- diabetic adults to determine and correlate the significance of associated risk factors found mean height was 169.95 cms. The mean weight was 70.55 kgs.

It was observed that there were 95 (33.3%) cases of dyslipidemia in our study. 44 (48.9%) male patients and 51 (26.2%) of female patients had dyslipidemia. Raj *et al.* (2016) in a descriptive crosssectional study determining lipid levels and comparing the lipid levels and prevalence of dyslipidemia found an overall incidence of dyslipidemia in urban population, aged more than 30 years, was found to be 74.5% and that among rural population was 68.8%.

It was observed in the present study that the Waist Circumference (WC) and Hip Circumference (HC) were significantly higher in male as compared to female subjects (p<0.05). In contrast, the Waist Hip (WH) Ratio of male and female subjects was comparable. The lipid profile parameters (TC, LDL, VLDL, HDL, LDL/HDL and TG) of male and female subjects in our study were comparable and statistically not significant (p>0.05). There was a significant association of BMI with Dyslipidemia. Manjareeka *et al.* (2015) in a hospital-based cross-sectional study found BMI was not significantly different in both the age groups. There was a considerably higher WC in the older group than the younger group.

It was observed in the present study that Waist Circumference (WC), Hip Circumference (HC) and Waist Hip (WH) Ratio increased significantly with increasing BMI. It was observed that TC, VLDL, LDL/HDL and TG increased substantially with increasing BMI. Chehrei *et al.* (2007) cross-sectional population-based study compared some anthropometric indices (BMI, WC, and W/Ht) to determine their relationship to dyslipidemia as an important cardiovascular risk factor reported overweight subjects. In the present study, there was a significant positive correlation between BMI and TG while substantial negative correlation existed between BMI and TC and HDL. It was observed that WH Ratio was significantly and negatively correlated with TG, TC and HDL. Chehrei *et al.* (2007) cross-sectional population-based study compared some anthropometric indices (BMI, WC, and W/Ht) to determine their relationship to dyslipidemia as an important cardiovascular risk factor found abnormal total cholesterol, LDLC, HDL-C and LDL-C level was more markedly abnormal than total cholesterol and HDL-C level for all age groups.

Anthropometric estimations are related with different wellbeing conditions (WHO, 1995), and BMI is by a wide margin the most broadly utilised estimation to reflect general heftiness. BMI, in any case, doesn't consider the extent of weight identified with expanded muscle or the dispersion of abundance fat inside the body, the two of which influence the wellbeing dangers related with obesity (Dalton *et al.*, 2003). People with a comparable BMI can shift significantly in their stomach fat mass, with premenopausal ladies regularly having a large portion of the stomach fat mass of men (Lemieux *et al.*, 1993). Additionally, its impediments are perceived by its reliance on race, with Asians having vast rates of muscle to fat ratio at low BMI values (Deurenberg-Yap *et al.*, 2002) and its change as indicated by age (Dalton *et al.*, 2003). For these reasons, a proportion of corpulence that considers the expanded danger of weight-related diseases due to the amassing of stomach fat is attractive. There is another inclination to utilise midsection circumference (Ledoux *et al.*, 1997) or abdomen to stature ratio (Ashwell and Lejeune, 1996) instead of midriff to hip proportion since concentrates with processed tomography have unveiled them to have a nearer relationship with intra-stomach fat and with changes in intra-stomach fat.

An expanded abdomen circuit is undoubtedly connected with raised hazard factors given its connection with instinctive fat amassing, and the instrument may include overabundance introduction of the liver to unsaturated fats. The combination of WC and height that is W/Ht could manifest better the morphology of an enlarged abdomen with inappropriate short stature (Jeong *et al.*, 2005). Raj *et al.* (2016) in a descriptive cross-sectional study reported with the BMI of above 27.5, the chance of

having dyslipidemia is 2.26 times higher than the standard BMI range of 18.5-22.99. Similarly, for the BMI between 2327.49, there is 1.85 times higher risk of dyslipidemia than average BMI. Manjareeka *et al.* (2015) in an emergency clinic-based cross-sectional investigation revealed in the more youthful age gathering, the mean estimations of lipid and anthropometric factors were commonly higher for the guys than the females; mean estimations of TC, TG and LDL were fundamentally higher. For both the sexual orientations, the mean estimations of all factors were higher in the more established age bunch than the more youthful age gathering. Notwithstanding, in the more established age bunch, the distinction in the mean values of VLDL, WC and WHR were significant between the genders.

CONCLUSION

Dyslipidemia is quite prevalent in young adults than expected. Low HDL- Cholesterol was the most common pattern of dyslipidemia found. BMI predicted the prevalence of hypertriglyceridemia in our study population. Increase in age also predicted the prevalence of hypertriglyceridemia in our study.

ACKNOWLEDGEMENT

Conflicts of interest

We all the authors declare no conflict of interest.

REFERENCES

Ashwell, M., Lejeune, S. 1996. Ratio of waist circumference to height may be better indicator of need for weight management. *BMJ*, 312(7027):377–377.

Cercato, C., Mancini, M. C., Arguello, A. M. C., Vanessa Quintas Passos, Villares, S. M. F., Halpern, A. 2004. Systemic hypertension, diabetes mellitus, and dyslipidemia in relation to body mass index: evaluation of a Brazilian population. *Revista do Hospital das Clínicas*, 59(3):113–118.

Chatlert, P. 2006. Rural-urban difference in lipid levels and prevalence of dyslipidemia: a population-based study in khonkaen province. *J Med Assoc Thai*, 89(11):1835–1844.

Chehrei, A., Sadrnia, S., Keshteli, A. H., Daneshmand, M. A., Rezaei, J. 2007. Correlation of dyslipidemia with waist to height ratio, waist circumference, and body mass index in Iranian adults. *Asia Pac J Clin Nutr*, 16(2):248–253.

Dalton, M., Cameron, A. J., Zimmet, P. Z., Shaw, J. E., Jolley, D., Dunstan, D. W., and, T. A. W. 2003. Waist circumference, waist-hip ratio and body mass index and their correlation with cardiovascular disease risk factors in Australian adults. *Journal of Internal Medicine*, 254(6):555–563.

Deurenberg-Yap, M., Chew, S. K., Deurenberg, P. 2002. Elevated body fat percentage and cardiovascular risks at low body mass index levels among Singaporean Chinese, Malays and Indians. *Obesity Reviews*, 3(3):209–215.

Ezzati, M., Lopez, A. D., Rodgers, A., Hoorn, S. V., Murray, C. J. 2002. Selected major risk factors and global and regional burden of disease. *The Lancet*, 360(9343):1347–1360.

Government of India Planning Commission 2011. Report of the Working Group on Disease Burden for 12th Five Year Plan. . 337 p.g, Accessed on: 19 May 2020.

Gupta, R., Misra, A., Vikram, N. K., Kondal, D., Gupta, S. S., Agrawal, A., Pandey, R. M. 2009. Younger age of escalation of cardiovascular risk factors in Asian Indian subjects. *BMC Cardiovascular Disorders*, 9(1):1471–2261.

Jeong, S. K., Seo, M. W., Kim, Y. H., Kweon, S. S., Nam, H. S. 2005. Does waist indicate dyslipidemia better than BMI in Korean adult population? *J Korean Med Sci*, 20(1):7–12.

Ledoux, M., Lambert, J., Reeder, B. A., Despres, J. P. 1997. Correlation between cardiovascular disease risk factors and simple anthropometric measures. Canadian Heart Health Surveys Research Group. *CMAJ*, 157(1):46–53.

Lemieux, S., Prud'homme, D., Bouchard, C., Tremblay, A., Després, J. P. 1993. Sex differences in the relation of visceral adipose tissue accumulation to total body fatness. *The American Journal of Clinical Nutrition*, 58(4):463–467.

Maffeis, C., Pietrobelli, A., Grezzani, A., Provera, S., Tatò, L. 2001. Waist Circumference and Cardiovascular Risk Factors in Prepubertal Children. *Obesity Research*, 9(3):179–187.

Manjareeka, M., Nanda, S., Mishra, J., Mishra, S. 2015. Correlation between anthropometry and lipid profile in healthy subjects of Eastern India. *Journal of Mid-life Health*, 6(4):164–164.

Mason, C., Craig, C. L., Katzmarzyk, P. T. 2008. Influence of Central and Extremity Circumferences on All-cause Mortality in Men and Women. *Obesity*, 16(12):2690–2695.

Mokdad, A. H. 2000. The Continuing Epidemic of

Obesity in the United States. *JAMA: The Journal of the American Medical Association*, 284(13):1650–1651.

Parinita, K., Madhuri, K. V., Sreekanth, V. 2012. Study of Serum Lipid Profile In Individuals Residing In And Around Nalgonda. *Int J Pharm Bio Sci*, 2:110–116.

Patel, M. 2011. Profile of the subjects with Diabetes: A hospital-based observational study from Ahmedabad, Western India. *Electronic Physician*, 3:378–384.

Raj, A. S., Sivakumar, K., Sujatha, K. 2016. Prevalence of dyslipidemia in South Indian adults: an urban-rural comparison. *International Journal of Community Medicine and Public Health*, 3(8):2201–2210.

Robert, E. O. 1998. Discovery of the Lipoproteins, Their Role in Fat Transport and Their Significance as Risk Factors. *J Nutr*, 128(2):439–443.

Santos, C. M. D., Silva, C. S., de Araújo, E. C., de Arruda, I. K. G., da Silva Diniz, A., Cabral, P. C. 2013. Lipid and glucose profiles in outpatients and their correlation with anthropometric indices. *Revista Portuguesa de Cardiologia (English Edition)*, 32(1):35–41.

Shah, S., Devrajani, B. R., Devrajani, T., Bibi, I. 2010. Frequency Of Dyslipidemia In Obese Versus Non - Obese In Relation To Body Mass Index (BMI). *Pakistan Journal of Science*, 62(1):27–31.

Sposito, A. C., Caramelli, B., Fonseca, F. A., Bertolami, M. C., Afiuneneto, A., Souza, A. D. 2007. IV Brazilian guideline for dyslipidemia and atherosclerosis prevention: Department of atherosclerosis of Brazilian society of cardiology. *Arq Bras Cardiol*, 88(1):2–19.

Thomas, S., Singh, S., Damodharan, R. B., Prakash, J., S 2015. Prevalence of dyslipidemia in asymptomatic young adults attending a mhc in a Tertiary hospital in Chennai. *Asian Journal of Science and Technology*, 6(7):1584–1587.

Vita-Finzi, L. 2005. Preventing chronic diseases: a vital investment. World Health Organization, Accessed on: 19 May 2020.

Wells, J., Fewtrell, M. S. 2006. Measuring body composition. Archives of disease in childhood. 91(7):612–617.

WHO 1995. Physical status: the use and interpretation of anthropometry. Report of a WHO expert committee. Technical Report Series 854. Geneva: World Health Organization Accessed on: 19 May 2020.

World Health Organization 2020. WHO Information Regarding Prevalence of Overweight and Obesity. Accessed on: 19 May 2020.

Yamwong 2000. Prevalence of dyslipidemia in the elderly in rural areas of Thailand, southeast asian j trop med public health. 31(1):158–162.

Yusuf, S., Reddy, S., Ounpuu, S., Anand, S. 2001. Global burden of cardiovascular diseases: Part I: General considerations, the epidemiologic transition, risk factors, and impact of urbanization. *Circulation*, 104(22):2746–2753.